

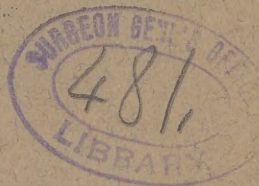
Hulbert (G. Jr.)

A Contribution for Definite and Known
Quantity and Quality in Mineral
Waters.

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Read by title at the Meeting of the Mississippi Valley Medical Association, Oct. 14, 15 and 16, 1891, held at St. Louis, Mo.

Reprinted from the "Journal of the American Medical Association." December 5, 1891.



CHICAGO:
PUBLISHED AT THE OFFICE OF THE ASSOCIATION.
1891.

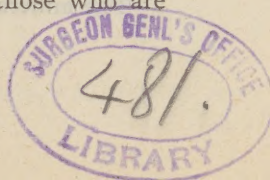
A CONTRIBUTION FOR DEFINITE AND KNOWN QUANTITY AND QUALITY IN MINERAL WATERS.

BY GEO. F. HULBERT M.D.,
OF ST. LOUIS, MO.

As medical science steps forward in her ceaseless stride for more and better understanding of disease in the human economy, so too is the desire and necessity created for better and more efficient means of relief. The study and use of the armamentarium at our command for this purpose has gradually and steadily brought before us that exceedingly valuable class of remedies known as mineral waters.

Nature, in her beneficent and bounteous provision for the wants of mankind, has herein provided a weapon of defense, which, unfortunately, has not commanded the special attention of the profession *en masse*, but has been accepted and utilized by only the few. Why this has been so is easily understood.

I. The presentation of the character and value of mineral waters has only too frequently been in the lines of the charlatan and unscientific; advertised by those interested in a reckless, catch-penny style, and certified to by those who are



incompetent to diagnose the conditions for which they are desirable or applicable.

2. The necessity of proceeding to the source of supply for the full benefits on the part of the patient, or accepting the admitted makeshift, purchase and use of the waters at home, put up and prepared only too frequently in an altered and inefficient condition.

3. The failure on the part of the profession in the use of natural mineral waters as presented in the open market to get results claimed by those interested.

4. Those who have overcome the difficulties presented have, speaking in a general way, done so by the use of the artificial product.

The subject is of sufficient importance, and the benefits to be derived are of such a character, that we feel compelled to speak plainly, and to the point, as to the why and wherefore of this discrepancy, in order that the way may be pointed out to intelligently evade the difficulties and disappointments.

It is agreed that the therapeutical value of a mineral water is dependent upon the quality and quantity of its solid ingredients, and the temperature at which it issues from the earth. Dr. F. A. Struve, of Dresden, more than eighty years ago clearly established the fact that the composition of a mineral water was due to the dissolving of mineral substances from the geological strata through which the water passed, through and by the aid of the solvent gases (carbon dioxide), a more or less high temperature, and the action of increased pressure in the interior of the earth. The water then, at the *mouth of the spring only*, will contain its full development chemically and exert its full effect medicinally.

The mineral substances composing the active

principles of mineral waters are mainly soluble alkaline and earthy salts, and such metallic ones as are readily soluble, but whose solubility is quickly changed by various combinations with oxygen. The omnipresent oxygen of the atmosphere, the volatile propensity of the carbon dioxide, the release from pressure, as well as change in temperature, necessitates an almost inevitable prompt chemical change on the escape of the water from the spring. This is specially noticeable in the ferrous and manganous waters. They are seen bubbling up in clear, sparkling, pure compositions from the bottom of the spring, which, upon discharging into the open air, promptly and fully precipitates the sensitive metallic salts in the form of the insoluble ferric and manganic salts. In those waters containing the earthy carbonates, the release from pressure on their appearance at the surface of the spring at once precipitates them as mono-carbonates by setting free the other equivalent of carbon dioxide. This would not have occurred if the proper degree of pressure had been maintained.

At Carlsbad, the hot "Sprudelwasser" forms a thin, earthy and ferric carbonate on the side of the glass while the patient is slowly emptying it, thus proving the prompt and almost immediate decomposition of thermal waters.

Dr. Geo. E. Walton, in his "Mineral Springs of the United States and Canada," page 113, says: "There is not the care used in bottling waters that should be observed, and there are but few waters that are adapted for shipment."

From the above, it is readily seen that only at the spring itself are we positive and sure to receive the water as Nature has elaborated it and prepared it for the use for which it is applicable.

It is well to remark that the mysterious occult

properties so much enlarged upon by the parties interested in any particular spring or springs is not comprehensible to the scientific mind, but must be referred to the personal equation of the patient. The real fact that is thus presented consists only in the *combination on the part of Nature of conditions accomplishing a certain purpose* that gives a value to this or that spring. To the uninformed this is unknown, therefore occult; to the chemist it is determinable and known, therefore ceases to be occult.

As regards the question of analysis of the waters as actually presented by Nature, there have been and are to this day many chances for error and careless work, but the scientific chemist of to-day is perfectly competent to determine the exact ingredients and their quantity, so that the statement made by some of the impossibility of giving a correct analysis will not hold good.

The essentials for this work are as follows:

The analysis of a mineral water must commence at the springs. Its temperature must be ascertained at different times of the day, and its relation established to the temperature of the surface.

The emission of gases, and their nature, has to be observed, and samples of the water mixed here, with known quantities of re-agents, to determine the quantities of free gases contained in the spring. The water to be examined at the laboratory should be carefully filled into glass-stoppered bottles from underneath the surface of the spring, in order to avoid any and every decomposition by access of the air. Chlorine, sulphuric acid and silicic acid must be determined in separate quantities of water; iron, lime and magnesia are determined in the same quantity of water, one after another, as it is necessary to

separate the iron before you can determine the lime, and this substance before you can get at the magnesia.

The alkalies must be determined in a portion of the water from which iron, lime and magnesia have become separated by such processes as do not add any alkaline substance to the water. Aluminum, barium, strontium and manganum oxide or protoxide, as well as phosphoric acid and iodine, bromide and other substances which usually occur in mineral waters in but small quantities, are determined from large quantities of water concentrated by evaporation in such manner as to obtain also the volatile substances in separate vessels and solutions.

If carried on correctly, and the water for analysis has been obtained at and from the springs in the proper manner, all volatile and solid ingredients can be determined by the expert chemist, except the mysterious soul of the spring which is attributed to them by people who believe in supernatural powers in mineral-water springs.

In the very nature of things, then, the great labor, expense and scientific knowledge required to properly comprehend and overcome the almost insurmountable difficulties, do we see why it is that mineral water, as found at the springs and in the market, differ so much in quality and results attained by their use. The door is open to all sorts of deception, and the results of accurate scientific investigation of many of the products presented in the open market and sold as the real genuine natural product, are startling in the discrepancies discovered.

As illustrating the facts discovered, the "Carlsbad Sprudel Salt" was found to contain 85 to 98 per cent. of glauber salts, when the analysis of

the water at the springs showed the percentage in the solid contents to be only about 45 per cent. Again, in the Apollinaris, it is found to have no iron and much salt, due to the manner in which the water is obtained and put up, while at the springs iron is present and much less salt.

Again, in "Determination of Lithia in Mineral Waters," by E. Waller, Ph.D., a paper published in the *Journal of the American Chemical Society*, Vol. XII, No. 6, we find further testimony of unreliability in "quality and quantity" of the several natural lithia waters as presented for sale in the market. After giving the three methods now available for determining the amounts of lithia salts—1, the phosphate method (Mayn's modification); 2, the amyl alcohol method (Gooch); 3, the flouride method (Carnot)—in all of which the spectroscope test is applied for control of errors, he arrives at the following definite results :

In the Farmville Lithia Water, after repeated experiments with large quantities of the water (10 litres), concentrated by evaporation, only sufficient lithia was found to produce the lithia line in the spectroscope, but not enough for quantitative estimation. With the Buffalo Lithia Water the reaction for lithium was more distinct when considerable quantities of the water were concentrated. From 20 litres of the water was obtained lithium sulphate corresponding to 0.0185 part Li. H. CO₃ per 100,000 of water.

Dr. Karl Luedeking, chemist at Washington University, in making an analysis of the No. 2 Spring water of this concern, failed to find any lithia whatever.

The Londonderry water gave the lithia reaction without much difficulty, being a little over 4 parts to 100,000. "The company puts up some

of the water in half-gallon bottles (called in their circulars 'Sulpho-Carbonated'), which is charged with CO_2 , and has also received the addition of some salts. The amounts of salts added appear to be somewhat irregular. For instance, the following results were obtained in parts per 100,000 of the water :

Half-gallon bottles,	37.35	total solids.
Pint bottles A.,	149.4	" "
" " B.,	104.2	" "
Average of 11 others,	224.7	" "

The proportion of lithium was the same as for the still water."

This extract, taken from the paper of Prof. Waller, in connection with the further statement that at several times the water has been found to contain no lithia whatever by other competent chemists as well as by himself, as well as the fact that none of the water can be obtained from the springs by disinterested parties or visitors, all access to the springs being denied, and applications for water referred to the bottling establishment in Nashua, needs no comment from us; the facts speak for themselves.

The Saratoga Hathorn proved to be the strongest lithia water examined, and contained the full percentage the analysis calls for (12 to 14 parts Li. H. CO_3 per 100,000 parts of the water, corresponding to $\frac{7}{8}$ grains per U. S. gallon).

One of the most difficult class of waters to handle away from the springs is the Ferro Manganous. We are pleased to give honor and credit to one of these springs, at least, for a determined endeavor to meet the requirements, and that is to the *Excelsior Spring Co. of Missouri*. They have simply accomplished all that can be done in the direction of presenting their product at a distance from the springs in its natural com-

position. The water of the spring referred to, "The Regent," is a Ferro Manganous water. It is only put up in bottles. The supply pipe to the bottling rack is started well down beneath the surface of the spring, a large hood being on the end; the water is then carried direct to the bottling department through pipe and pump. Carbon dioxide is forced into the empty bottle, thereby expelling the atmospheric air from it; then it is filled with the water under high pressure of carbon dioxide, and securely corked. In this way at no time does the water come into contact with the oxygen of the air, and therefore retains its delicate chemical composition. It is consequently rare to find any precipitate in the "Regent Water," as it is called, of this spring, clearly proving the fact that its composition is the natural one. For a water of its class it is not excelled by any, and to those who can go to the springs, the "Regent Water" and the "Elms" are a delightful, health-giving combination to enjoy.

With the known variation from time to time in the proportion of ingredients of mineral waters at the springs, as well as the exceedingly weak impregnation of most of them by mineral substances necessitating the use of large quantities for very long periods, and the undoubted liability to and fact of their alteration, adulteration, chemical variability as compared to the natural product at the springs, it is not at all strange that the profession at large has little satisfaction or confidence in their use. In all cases where we get definite results, it is due to the fact, that we have a water of sufficient power and quality. The attainment of results being the exception, what can we do? *Use what we know has a definite quality and quantity at all times and results*

will be definite. Hence we find a legitimate and useful field for the artificial product. *The necessary source* for the artificial product is an *honest, competent, scientific chemist.*

The following is taken from Liebig's Chemical Dictionary, 1851, Vol. v, p. 320. "Prompted partly by scientific interest and partly by the desire to offer to sufferers who live long distances from mineral springs an opportunity of enjoying their beneficial action, efforts were made to reproduce these waters by artificial process—and in the course of time this end has been attained with such perfection as to permit the artificial product to place itself along side of and compete in every respect with the natural mineral waters." This is authoritative commendation of honest and scientific labor, the pioneer in which was Dr. F. A. Struve, of Dresden, who established and proved not only by actual experiment the theory of the natural formation of mineral waters, but produced the first artificial Carlsbad water and administered it in conjunction with Dr. Soltmann, in the first season to over 300 patients, with results fully as satisfactory as attained in the use of the natural Carlsbad Sprudel at the Springs. The good work has progressed until to day, when there is no mineral water of any positive value which has not been satisfactorily manufactured, and best of all, there is no mineral water known that cannot be and is successfully modified or improved to meet the determined requirements of any disease for which it may be of value. In this country humanity as well as the medical profession is under lasting obligations to two gentlemen who have, in spite of every conceivable obstacle that could be thrown in their way by interested parties of mineral springs and products, steadily and persistently applied their

scientific (medical and chemical) attainments and means, to the end that there should be presented to those desiring them, artificial or manufactured mineral waters of a positively known and definite value as relates to quality and quantity of solid ingredients, and thus insure efficiency and prompt results in their use. We refer to Carl H. Schultz, of New York, and Dr. Enno Sander of St. Louis.

It is only those who are familiar with the mineral water question and the celebrated mineral water controversy, "that can appreciate" the work accomplished by these gentlemen, and when we consider that scientific precision in the manufacture, honesty of purpose in the presentation of their products, and broad scientific equipment and attainments in qualification for the work they had in hand, have been the motive and power behind the throne, "damning with faint praise" is simply an impossibility from any one actuated by the principles of truth and honor.

Our practical experience with the manufactured product has been confined to that of Dr. Enno Sander, of St. Louis, and for the purpose of demonstrating their purity and efficiency we desire to call special attention to only three of the waters of this laboratory. "The Tenfold Carlsbad Sprudel," the "Garrod Spa" or "Lithia Potash Water," and the sparkling "Benzoated Lithium Water."

The Carlsbad Water is made in three strengths, the single, double and tenfold; the purpose of this being to enable the consumer to get the full advantage of the original *thermal* effects, without exposing the manufactured water to the risky and decomposing influences of heating each dose. This is at once accomplished by taking an equal

or many fold quantity of hot water, adding direct from the bottle the necessary quantity of the mineral water and at once drinking the same.

The value of the Carlsbad water is beyond controversy and cavil in most hepatic troubles and many gastric intestinal diseases; hyperæmic conditions of the liver from whatever cause are most frequently relieved. This one therapeutic effect is of extended range. Frerichs testifies in no doubtful manner as to hepatic diseases. Niemeyer is exceedingly explicit as to the value and benefits derived in gastric catarrh.

As illustrating the efficiency of the Sander's artificial product, we present the following case of hepatic hyperæmia and catarrh of hepatic ducts and duodenum, with the development of miliary gall stones, treated by the use of the "Tenfold Carlsbad Water." J. H. P.: American aged 50; came under my observation January 1st, 1889. His family history was a remarkable one of intemperance and abuse of alcohol. His father, three uncles, both grandparents (male) and three brothers were what to-day in common slang would be termed "steady lushers," with no choice as to quality of liquor consumed. No history of rheumatism, gout or nervous disease, but in all there were intestinal and gastric troubles. Individually the patient had been a constant steady miscellaneous drinker from 28 years of age up to 46, rarely what he considered intoxicated. All during his life and up to this time had never been sick or incapacitated from his labor, that of bank teller. Since 46 years of age he has been temperate, rarely using anything. About two years ago, without any apparent cause or deterioration of his general health, he began to suffer with pains in the right lumbar region, more like a soreness or over-

sensitiveness, not aggravated by motion. The attack would commence every night from 9 to 11 P.M., and become sufficient in severity to disturb his rest; relief was usually attained in an hour or two by means of hot mustard applications. This deviation from health was accompanied by rectal disturbances in the way of a prolapse of moderate severity, and continued for a period of six months with no apparent aggravation, when pain was noticed in left part of right hypochondria. This, while, like the other pains, was more severe and developed an ill-defined sense of threatened danger. Shortly after, bloating of the abdomen supervened and his nightly sense of misery became more severe, to the degree that medical advice was demanded. "*Parri passu*" with medical attendance his sufferings increased, demanding opium for relief, untill the crisis was at last reached by a severe attack of nausea and vomiting and the appearance of a pronounced attack of jaundice; pains ceased, jaundice gradually disappeared and for nine months he was a well man in his own opinion. The second attack then supervened, passed through the same stages, save that it lasted only ten days and was tenfold more severe. Clay colored stools were noticed during this attack; the lumbar distress did not entirely subside with the close of this attack, but nightly visited him for about two months, when his third attack came on, less severe than the second, but requiring three grains of opium every night to relieve it; it persisted, up to the time we first saw him. Examination revealed a moral coward in a man of education and intelligence, completely cowed by his sufferings; fat and flabby of tissue, skin dry, tongue heavily coated, bowels fairly regular, appetite fair, urine smoky with bile reaction;

sensitiveness over duodenum and ileo cæcal valve, no distension of the gall bladder detected, liver enlarged, but not sensitive. Every means and method of treatment found on the books or known to us was faithfully tried. That seemingly giving the most temporary relief and keeping things in abeyance, was the use of *dioscorea villosa* in conjunction with *papya carica* and saline purgation. The sweet oil method was a total failure. By the above means it was possible to dispense with opium save now and then. Close and continued examination finally revealed miliary hepatic stones. No large concretions were found at any time. This cleared up the question as to the part played by the condition of the hepatic ducts, and Carlsbad Sprudel water (Sander's) was selected as the sole therapeutic measure. A wine glass of the tenfold strength in a goblet of *hot water* was used three times a day; in one week his pains entirely ceased, general health began to improve and in one month he was symptomatically in his normal condition. The water was continued for three months steadily, when it was cut down to a single dose at bed time and kept up for two months more. He has not had an attack since; from time to time he uses the water as a safeguard on his own responsibility.

Another case of hepatic disturbance in which the condition seemed from the evidence to be inspissation of the gall, coming on at irregular periods, occurred in J. A. R., a Pullman palace car conductor. His attacks were preceded by a period of constipation and gastric duodenal distress lasting for about a week, when a severe attack of hepatic colic would develop, gradually and steadily increasing, reaching its acme in severe nausea and vomiting. No jaundice was

present nor has been at any time. Free saline purgation usually brought temporary relief. He was placed upon Carlsbad water tenfold (Sander's) and for nearly two years has not had an attack; the water was used steadily for six months.

The formula of the Sander's Carlsbad is that of the Natural Carlsbad Sprudel, as determined by the analysis of Berzelius and Bauer; being rich in its proportion of sodium sulphate, carbonate and chloride, and positively uniform in strength, it is readily seen, why in its use we are enabled to attain uniform results. In the use of the Carlsbad water it is necessary that the same care and conditions be attained in its administration as at the springs. It is an alkaline *thermal* water, it must therefore be used hot, 112° to as hot as can be borne. The range in temperature at the springs is from 112° to 152° . The best time for use is an hour before or two to three hours after eating. Used with these precautions and for a sufficient length of time, no one will fail to get definite and positive results from its use.

In our consideration of the Garrod Spa, the Lithia Potash Water, and the Benzoated Lithium Water of Sander's Laboratory, we are in a position to speak positively as to their value in rheumatism, gout, lithiasis, and allied disorders, having absolutely discarded from our armamentarium in the handling of these diseases, all other internal medication save that needed to meet complications for the time being. It is entirely unnecessary to enter into an extended consideration of etiology, symptomatology, or unsatisfactory therapeutic experiences of the past in the management of these diseases; sufficient to say that to-day the Garrod philosophy, interpretation, comprehension and treatment of gout, rheu-

matism and allied disorders is the only conception that can be successfully sustained. In brief, that it is some interference or defect in the metabolic changes which take place in the human economy resulting to the presence of an excess of uric acid, that the alkaline method of treatment is the most effective yet presented.

In a paper recently read by Sir Wm. Roberts before the Royal Medical and Chirurgical Society, we find much light thrown upon the immediate determining cause of this excess of uric acid, and observations of exceeding importance regarding the behavior of the same in the blood and tissues and especially interesting in regard to the phenomena of gout. He demonstrates the fact that uric acid in the blood exists in the form of the *soluble quad-urate*. Under certain conditions, where the alkalinity of the blood be lessened or the excretion of the quad-urate by the kidneys be delayed, the acid combines with the sodium carbonate and forms the bi-urate of sodium, a salt exceedingly insoluble in blood serum. Synovia being less alkaline than the blood, it is suggested, that this may account for the deposit of bi urate crystals in and about the joints. The immediate effect being to relieve the blood of the excess of acid; this at once becomes consistent with the chemical phenomena observed after an attack of gout. The periodicity of gout is explained by what he terms the process of "maturation," which is the progressive taking up of the quad-urates by the blood and fluids of the body, when finally the point is reached (possibly saturation), when it suddenly breaks up into the bi-urates and precipitates, earlier in the synovial than in the blood tissues. The stage of solution was hastened by increased alkalinity of media; no appreciable effect in retarding the period of

maturation and precipitation was produced by this means, and the addition of salts of sodium notably hastened the process. The addition of salts of potassium, lithium or magnesium did not appear to have any effect either way, save the chloride of potassium seemed to prolong the period of maturation. The *factor* in determining the duration of the period of maturation was the proportion of uric acid, hence the necessity for caution in administering alkalies, which if administered when the blood is near the point of saturation by uric acid, or near the close of the period of maturation, may, by favoring the formation of the urate, precipitate an attack of gout. Taken earlier when the margin of solubility for the uric acid is greater, the alkalies will facilitate the conversion of the acid into the quadrates and present them for elimination by the kidneys. This accomplished freely, the danger of an attack ceases. It is clear that large quantities of water are needed. From the above it is evident, and the observations tally with experiences in the management of these troubles, that to receive the full benefit of the alkaline treatment, elimination by the kidneys especially is paramount; this absent, then the skin and bowels must be brought into play. The sodium salts are not desirable, and moreover the treatment must be sufficiently prolonged to overcome not only the direct exciting cause, but also possibly delayed, by treatment, the period of saturation.

The above researches also give us valuable suggestions for therapeutics and combinations to meet especial conditions. In the administration of alkalies it would seem proper that we have two formulas, the one for the milder manifestation such as the rheumatic, where apparently, according to Dr. Roberts, the process may be con-

sidered the accumulation of the excess of uric acid and delay in its passage into the quad-urate, giving us the inflammatory stage by toxæmia, so to speak, and the other where the process is more fully developed passing into the stage of quad-urate formation with the ultimate precipitation of the bi-urate in crystals and concretions, giving us inflammatory phenomena more directly if not wholly by mechanical effects.

It is beyond controversy that the lithium carbonates or preferably bicarbonates, are of pre-eminent value. In the light of Dr. Roberts' observations it may be suggested that the most easily broken up bi carbonate of lithium, being present in the blood, that as the quad-urates were produced, they would select the former in preference to the carbonate of sodium, thereby producing the soluble urate of lithium, and not the insoluble bi-urate of sodium. In order that the degree of alkalinity be not too pronounced or perniciously hastened, the guarding of the process by the benzoate of lithium, would not only offer more lithium for conversion into the soluble urate of lithium, but by setting the benzoic acid free, would insure the acidity of the excretion, the urine, as well as prevent too much alkalinity of the blood. Hence we find the Lithia-Potash water best adapted for the rheumatic, and the Benzoated Lithium water for gout, rheumatic gout, renal and vesical concretions. It has been our practice to use the latter in all acute severe rheumatic conditions, until they were controlled, then change for the steady, long continued use to the former, the "Garrod Spa" water. In gout, rheumatic gout, gravel and vesical concretions the benzoated has been of most value until the morbid process was well nigh completely overcome. The formula is follows:

- R. Lithium Benzoate, gr., 12.823.
 Lithium Bicarbonate, gr., 13,784.
 Potassium Bicarbonate, gr., 10.000.
 Sodium Chloride, gr., 10.000.
 Carbonated Water, ℥xvj. ℥.

The usual dose is one third pint three times a day between meals and at bed time; in severe cases increased to one half pint at same time of day until symptoms are under control; then the former dose.

The "Garrod Spa," named after Dr. Garrod, is the above formula with the lithium benzoate omitted. These formulas are not susceptible of being compounded by simple mixture, but must be produced under pressure and in the nascent state, hence require skill and caution in manufacture.

As in demonstration of their great value and reliability we desire to present the following brief case records for consideration.

Mrs. M.: Mulatto aged 30, was taken with a severe attack of myalgic rheumatism. Her environment was miserable in every respect. The symptoms were for a time quite puzzling, resembling in many points a case of trichina. At no time was there any synovial inflammation and only at a late stage were the fibrous structure about the joints involved; we were not able to find a voluntary muscle which was not exceedingly sore and tender to touch. Movement was impossible without agonizing pain. Emaciation was rapid and temperature ranged from 101-103°. For three long months did we medicate this patient with alkalies and all other drugs considered of any value, until she and her physician became thoroughly disgusted. Having only attained slight amelioration of her sufferings, finally selected the Garrod Spa (Sander's) on the recommendation of a brother practitioner. In two

weeks the symptoms began to abate, in six weeks she was able to walk and in ten weeks she was symptomatically well. This was our first experience with artificial mineral waters, and we were inclined to be a convert. The next case presented occurred in the St. Louis City Hospital under the care of Dr. H. C. Dalton, a woman pregnant, suffering from rheumatism. The following report from Dr. Dalton will suffice.

OFFICE OF CITY HOSPITAL,

H. C. DALTON, M.D, Supt. and Surgeon in Charge.

ST. LOUIS, MO., Oct. 10, 1891.

DR. GEORGE HULBERT, 3026 Pine street :

Dear Doctor.—Your card of yesterday received. Christy S. was admitted to this institution May 22, 1891, suffering from a very acute attack of articular rheumatism. She was in her fifth month of pregnancy.

The rheumatism developed three days prior to her admission to the hospital. I saw her shortly after admission, and found the following condition: Left knee greatly swollen; complained of great pains in right hand and arm, both of which were swollen. A few days after admission, her left wrist and right ankle became greatly swollen and acutely painful.

She was given large doses of salicylate of soda, which gave her but little, if any, relief. The changes were rung upon the various remedies for acute rheumatism without avail. After July 6 she was given a bottle daily of Benzoated Lithium Water (Sander's). In a few days marked improvement was observed. On August 12, patient was free from pain and able to sit up, the swelling having entirely disappeared from her joints. In fact, she expressed herself as feeling entirely well, though still quite weak.

She has not had the slightest symptom of the disease since. On the 3d ult. she was confined, and has done well since. After taking the Benzoated Lithium Water for ten days, the amount administered was increased to a bottle and a half daily.

Very truly yours,

H. C. DALTON.

The next case was that of J. R., aged 35, a telegraph lineman of splendid physique and strength, accustomed to all sorts of hard labor

and exposure; is temperate in all things. Had noticed for several months at times that his urine was very high colored, with the brick-dust sediment. He first came to me in January, 1891, complaining of rather severe pains in right lumbar region, which came on suddenly and lasted for about two hours. His urine the day or two before was quite well charged with the brick-dust sediment. The first time of emptying his bladder after the above attack of pain he noticed that it was bloody, and on standing in bottle for a short while, the quantity of blood and mucus would extend half way up the depth of fluid. In a few days this attack passed away under the use of simple medications. Occurring at intervals of two to four weeks, the patient had four more experiences of the above character, except each one was of a decidedly more severe and grave degree, until the last one lasted two weeks, and confined him to his bed. The urine in this attack was to all appearances mostly blood, and, on standing, the entire depth of fluid in bottle was filled with sediment.

From the suddenness of onset of symptoms, the hematuriac, the pain, and presence of gravel in the urine, renal calculi were suspected, and it was decided, after making a fair trial of medication and no results were attained, to operate and remove the stone from the kidney. The Benzoated Lithium Water (Sander's) was selected for the trial. Since using this water, one-third pint three times a day, he has not had another attack, nor has there been the slightest indication of gravel in the urine save in September, 1891. Thinking he was all right, he stopped, in August, 1891, the use of the water, and one day in the latter part of September, 1891, had a touch of his old lumbar pain, and noticed his

urine was smoky. At once he began again the use of the Benzoated Lithium Water (Sander's), and is still using it. The presumption is that there is a stone in the pelvis of the kidney which is being slowly dissolved, for otherwise we are at a loss to account for the prompt return of the local symptoms after so long a use of the water, from March to August. The probability is on any other assumption that the stone will be ultimately entirely dissolved.

Experiences, such as prompt relief of attacks of lithiasis, and the numerous concomitant nervous and organic phenomena, have, especially in women, been of frequent occurrence in practice.

The last case we present is that of Mr. N., aged 55 years; a rheumatic for the last fifteen years; occupation as fireman in fire department. Has had repeated attacks of acute articular rheumatism, extending into and involving the structures about joints and tendons to such a degree that the case resembled very closely rheumatoid arthritis. The last attack, and the first in which we saw him, began January 1, 1891, following a very hard night at a large fire. This attack continued with more or less severity up to June 15. He was absolutely confined to his bed, unable to move or bend a foot. There was no regular professional attendance, the patient treating himself by nostrums and etcetera. We first saw him June 18, 1891, and found the man in a miserable state. There was not a joint of his body, save the shoulders and left hip, that he could move; tissues about joints œdematous and thickened; joints more or less anchyloid; skin pale and flabby; muscles soft and relaxed; ankles and all joints of feet immovable, so that toes could not be moved; Carpus and metacarpal joints immovable, and turned to ulnar side; de-

formities and enlargement of phalangeal joints in both hands; no appetite; continually and freely a sickening, excessively sour-smelling perspiration was present; mentally, the man was cowed and despondent.

He was ordered one half pint of Benzoated Lithium Water (Sander's) three times a day. Diet regulated, bowels kept free, and left with the instructions that in one week he was to report to my office for treatment by static electricity; he was to get there if he had to be carried. In five days his pains had entirely ceased, and he was set up in a rocker; in ten days he was helped down stairs into a carriage and into my office. In one month from day of my first visit he was able to go on duty as night watchman in fire-engine house. This was July 18, 1891, since which time, and up to to-day, he has not lost a single night watch. The sole value claimed for the Benzoated Lithium Water in this case is the relief from pain and further progress of the rheumatic trouble by correcting at once the development and retention of the uric acid in the blood. His remarkable progress in overcoming the results of the rheumatic inflammation was due to the collateral treatment, static faradization and exhibition of the iodides, as well as the strong mental stimulus of knowing that on July 18, 1891, he must return to duty or lose his place.

Such is the record of experiences and observation which we lay before the reader, and upon which we base our plea for "known and definite quality and quantity in mineral waters." The record is the reason for the faith that is in us. The results attained are our justification in declaring for the honest, scientific, known artificial product, in preference to the dishonest, unscientific, unknown and unreliable so-called *natural*

product. The rule, in the use of the latter, is disappointment and failure; in the use of the former, definite, successful results, giving profit and pleasure.

GOUTY DIABETES.—This rather complicated condition is one which requires great care in its therapeusis, and its treatment is frequently of a prolonged character. Many methods have been proposed with more or less success attendant upon their application. One of the best which has been devised is that of Dr. Martineau, of Paris, who has definitely cured 67 out of 70 cases in the past twelve years. Dr. Dujardin-Beamitz has also recommended and even adopted this treatment, in which they have employed carbonate of lithium and arsenic in such manner as it is combined and manufactured by Enno Sanders, whose formula is as follows:

R.—Lithium bicarbonate, gr. 5.514.

Sodium arseniate, gr. 0.100.

Carbonic water, $\bar{3}$ 16.00. M.

This quantity, which is the contents of one bottle, should be taken, mixed with claret wine, at three successive meals. The diet need not be restricted, with the exception of starch, sugar and fruit. The latter articles should be prohibited, but in so far as the rest of the diet for diabetics is concerned, considerable freedom may be permitted. In taking the water care must be exercised to drink it either during or immediately after eating, although it is a better and preferable method to take it during the course of the meal. The addition of the carbonic water renders the remedial agents less irritating to the stomach and also adds to its palatable qualities.

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BROMINE WATER. — The administration of the bromides, in certain cases, is followed by the happiest results, more especially in those cases in which there is an excess of blood in the cerebral circulation. One of the great disadvantages attending the administration of these salts is their proneness to create gastric disturbances and, in that manner, establish a certain degree of intolerance in the subject. Largely diluted they are not apt to produce this disturbance, more especially if the diluent be carbonated water. Bromine water (Enno Sander's) contains 100 grains of bromine salts in sixteen ounces of water and can be taken without producing any unpleasant local effects. In doses from a tablespoonful to a wineglassful, according to the age and condition of the patient, it constitutes a powerful anodyne. It is especially adapted to such conditions as hysteria, reflex spasms, etc., as well as to those functional nervous troubles in which the bromides are so largely used.

